AMENDMENTS TO THE CLAIMS

1. (Original) A valve prosthesis for implantation with a vascular vessel, comprising:

a support frame supporting one or more leaflets, wherein each of the one of more leaflets has a co-apting edge adjacent an end of the support frame;

the support frame and leafets together functional as a valve to restrict blood flow in a first direction when implated in the vascular vessel; and

a least one centering support element configured to contact a wall of the vessel at a position distal to the co-apting edge.

2. (Currently Amended) A valve prosthesis for implantation with a vascular vessel, comprising:

a plurality of legs, each comprising a leaflet having an inner edge and an outer edge, and a support frame carrying the outer edge of the leaflet;

wherein the plurality of legs are interconnected such that the support frame includes a serpentine configuration in which the outer edges of the leaflets exert radial force against the walls of vascular vessel and generally conform to the contours thereof;

wherein the inner edges of the plurality of leaflets traverse the vessel lumen such that the plurality of leaflets are cooperable to define an opening therebetween to permit fluid flow in a first direction along the vascular vessel, while engaging each other sufficiently to restrict fluid flow in a second direction opposing the first direction; and

wherein the valve prosthesis further comprises a second frame portion attached to least one the plurality of legs and extending at least one of distally and proximally therefrom.

3. (Original) A valve prosthesis for implantation with a vascular vessel, comprising:

a serpentine-shaped frame having a first pair of bends and a second pair of bends, a first pair bends being oriented at a first end of the serpentine-shaped frame and located approximately 180° degrees with respect to one another, the second pair of bends being oriented at the second end of the serpentine-shaped frame and located approximately 180° degrees with respect to one another and approximately 90° with respect to the first pair of bends, wherein the first pair of bends and a first bend of the second pair of bends comprise a first leg of the implantable valve, and the first pair of bends and a second bend of the second pair of bends comprise a second leg of the implantable valve, each of the first and second legs having a covering extending thereover, wherein the first and second legs define a opening therebetween that opens and closes in response to bidirectional fluid flow.

4. (Original) The valve prosthesis of claim3 , wherein the frame includes at least one open section therealong, the at least one open section including a circumferential member partially encircling the frame, thereby providing a bridge across the at least one open section.

5. (Original) The valve prosthesis of claim 3, wherein the the frame includes at least one circumferential member attached to the adjacent pair bends of the first and second legs the frame such that the circumferential member is interposed between the legs and the walls of the vascular vessel to a least limit contact therebetween.

6. (Original) The valve prosthesis of claim 3, wherein the covering comprises a biomaterial.

7. (Original) The valve prosthesis of claim 6, wherein the biomaterial includes an extracellular collagen matrix.

8. (Original) A valve prosthesis for implantation within a vascular vessel, comprising:

a support frame supporting two or more leaflets, the two or more leaflets including a co-aptation position;

the support frame and leaflets together functional as a valve to restrict blood flow in a first direction when implanted in the vascular vessel;

the support frame comprising frame elements to which the leaflets are attached, the frame elements non-circumferentially contacting the wall of the vascular vessel such that the frame elements are non-centering of the co-aptation position; and

at least one centering support element configured to center the co-aptation position.

9. (Original) The valve prosthesis, wherein the at least one centering support element extends laterally from the support frame such that it is interposed between at least one of the two or more leaflets and the walls of the vessel.

10. (Original) A valve prosthesis for implantation within a vascular vessel, comprising:

a support frame supporting one or more leaflets;

the leaflets formed with a remodellable material configured for contact wall of the vascular vessel in a predetermined orientation;

at least one centering support element for facilitating contact between the wall and the material in the predetermined orientation.

11. (Original) A valve prosthesis for implantation within a vascular vessel, comprising:

a valve structure having a first end and a second end, a plurality of leaflets that include an outer edge and an inner edge, the plurality of inner edges defining an orifice therebetween for allowing the passage of fluid in a first direction, the plurality of leaflets configured to co-apt with one another to restrict the passage of fluid in a second, opposite direction;

a support frame that generally co-extends along the outer edges of the plurality of leaflets; and

a centering support structure comprising one or more centering elements extending from the valve structure that engage the walls of the vascular vessel in a manner to facilitate centering of the orifice within the lumen of the vascular vessel during deployment of the valve prosthesis.

12. (Original) The valve prosthesis of claim 11, wherein the one or more centering elements extend from at least one of the first end and the second end of the valve structure

13. (Original) The valve prosthesis of claim 11, wherein the one or more centering elements comprise a second frame portion attached to the first end of valve structure and extending longitudinally therefrom such that the second frame portion is deployed prior to the valve structure..

14. (Original) The valve prosthesis of claim 11, wherein the one or more centering elements comprise a second frame portion attached to the second end of valve structure and extending longitudinally therefrom such that the second frame portion is deployed after the valve structure.

15. (Original) The valve prosthesis of claim 11, wherein the one or more centering elements comprise a second frame portion attached to the first end of the valve structure and a third frame portion attached to the second end of the valve structure, both extending longitudinally from the valve structure.

16. (Original) The valve prosthesis of claim 11, wherein the centering support structure includes centering support elements extending laterally from the support frame to contact the walls of the bodily passage, the lateral centering support elements being interposed between the plurality of leaflets and the walls of the vascular vessel.

17. (Original) The valve prosthesis of claim 11, wherein the plurality of leaflets comprise a remodelable extracellular collagen matrix.

18. (Original) The valve prosthesis of claim 11, wherein the plurality of leaflet consists of two leaflets.

19. (Original) The valve prosthesis of claim 11, wherein the plurality of leaflet consists of three leaflets.

20. (Original) A valve prosthesis for implantation within a vascular vessel, comprising:

a valve structure including a plurality of legs, one or more of the plurality of legs comprising a leaflet having an inner edge and an outer edge, and a support frame carrying outer edge, such that the outer edge directly contacts the wall of the bodily passage when deployed therein; and

a centering support structure comprising one or more centering elements attached to the legs of the valve structure, the one or more centering elements configured to contact the walls of the vessel at points extending at least one of proximal, distal, and lateral to the outer edge.

21. (Original) The valve prosthesis of claim 20, wherein the centering elements span adjacent ones of the plurality of legs of the valve structure.

22. (Original) The valve prosthesis of claim 20, wherein the centering elements extend laterally from the plurality of legs of the valve structure.

23. (Original) A valve prosthesis for implantation within a vascular vessel, comprising:

a valve structure including a plurality of legs, one or more of the plurality of legs comprising a leaflet having an inner edge and an outer edge, and a support frame carrying the outer edge such that the outer edge directly contacts the wall of the vascular vessel when deployed therein;

wherein the support frame comprises a plurality of interconnected serpentine rows each having at least eight bends and eight struts; and

wherein the plurality of leaflets are attached to the support structure such that each spans at least two adjacent ones of the plurality of serpentine rows, and such that the at least eight struts of each of the at least two adjacent rows include both struts generally covered by a portion of the outer edge and struts that remain uncovered by the leaflet material, the uncovered struts comprise centering support elements configured to provide additional longitudinal support to the valve prosthesis.

24. (Original) The valve prosthesis of claim 23, wherein:

the plurality of interconnected serpentine rows comprise two adjacent rows defining a row of closed cells.

25. (Original) The valve prosthesis of claim 23, wherein the plurality of leaflets span at least three serpentine rows of the support structure.

26. (Original) The valve prosthesis of claim 23, wherein the plurality of interconnected serpentine rows are formed from a single nitinol tube.

27. (Original) A valve prosthesis for implantation within a vascular vessel, comprising:

two or more leaflets having a resilient outer edge and an inner edge, the plurality of resilient outer edges collectively exerting radial force against the walls of the vascular vessel, the plurality of inner edges configured to define an orifice to allow passage of blood flowing toward the heart and coapt with one another to restrict blood flowing in a direction opposite thereto; and

a plurality of struts extending from at least one resilient outer edge to contact the walls of the vascular vessel to facilitate the centering of the orifice within the vascular vessel during deployment of the valve prosthesis.

28. (Original) The valve prosthesis of claim 27, wherein:

the two or more leaflets comprise a remodelable material.

29. (Original) A valve prosthesis for implantation within a vascular vessel, comprising:

one or more leaflets having a resilient outer edge adapted to exert force against the walls of the vascular vessel; and

one more centering support elements that extend laterally from the one or more leaflets to contact the walls of the vessel to provide longitudinal centering support to the valve prosthesis.

30. (Original) A valve prosthesis for implantation within a vascular vessel, comprising:

a self-expanding support frame which in a relaxed condition has leaflet-supporting frame elements extending transverse to a longitudinal axis of the support frame;

the leaflet-supporting frame elements supporting one or more leaflets, the one or more leaflets also extending transverse to a longitudinal axis of the support frame in the relaxed condition and each presenting an outwardly-facing leaflet surface; and

the support frame also including at least one frame element occurring outward of the outwardly-facing leaflet surface and longitudinally co-extensive with at least a portion of the surface.

31. (Currently Amended) The valve prosthesis of claim ~~*~~ 30, wherein the one or more leaflets comprise a remodelable material.

32. (Original) A valve prosthesis for implantation within a vascular vessel, comprising:

a support frame having a first end and supporting one or more valve leaflets;

the support frame having a plurality of frame elements terminating at said first end and configured to contact the wall of the vascular vessel at a plurality of discrete positions thereby creating pivot points rendering the support frame non-self-centering; and

at least one centering support element attached to the support frame for contacting the vessel wall at a position longitudinally spaced from the pivot points and reducing pivotal freedom of the support frame about the pivot points.

33. (Original) The valve prosthesis of claim 32, wherein the centering support elements are proximal to pivot points.

34. (Original) The valve prosthesis of claim 32, wherein the centering support elements are distal to pivot points.

35. (Original) The valve prosthesis of claim 32, wherein the centering support element are co-extensive with support frame.

36. (Original) A valve prosthesis for implantation within a vascular vessel, comprising:

a support frame having a first end and supporting one or more valve leaflets; and

at least one centering support element attached to the support frame, the centering support element comprising two elongate portions converging toward one another and connected through an adjoining portion adapted for contact with the vessel.

37. (Original) A valve prosthesis for implantation in a body vessel, comprising:

first and second self-expandable frames, the first self-expandable frame axially spaced from the second self-expandable frame;

a connecting strut connecting the first and second self-expandable frames; and

a valve leaflet attached to the first self-expandable frame and moveable between a first position that permits fluid flow through the body vessel in a first direction and a second position that substantially prevents fluid flow through the body vessel in a second, opposite direction.

38. (Currently Amended) The valve prosthesis of claim ~~x~~ 37, wherein the valve leaflet is attached to the connecting strut.

39. (Original) The valve prosthesis of claim 37, wherein the second self-expandable frame contacts an inner wall of the body vessel when in an expanded configuration.

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